

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A method of ~~determining~~ using a digital filter for seismic signals comprising the steps of:

receiving seismic data;

determining the digital filter by:

defining constraints representing a filter for preserving signals representing reflection and/or refractions from sub-surface structure and suppressing noise signals in seismic signals; and

using an iterative process with each iteration further comprising the steps of:

- transforming a filter obtained from a previous iteration into a transform domain;

- applying in said transform domain first constraints;

- inverse transforming the filter with the applied constraints into a sample domain; and

- applying in said sample domain second constraints to obtain an iterated filter; and

using the digital filter to remove noise from the seismic data.

2. (Original) The method of claim 1 wherein each step of the iterative process includes the transform of the filter (coefficients) into the wavenumber or frequency-wavenumber domain and the inverse transform back into the spatial or temporal-spatial domain.
3. (Original) The method of claim 2 wherein in each step of the iterative process the filter is constrained to a predefined tolerance in the wavenumber or frequency-wavenumber domain.
4. (Original) The method of claim 2 wherein in each step of the iterative process the filter is constrained to a predefined response outside a finite region in the spatial or temporal-spatial domain.
5. (Original) The method of claim 2 wherein in each step of the iterative process the filter is constrained to a predefined response outside a finite region in the spatial or temporal-spatial domain and in each step of the iterative process the filter is constrained to a predefined tolerance in the wavenumber or frequency-wavenumber domain.
6. (Original) The method of claim 1 wherein the filter is obtained by applying alternating projection onto constraints defining convex sets of square summable sequences.
7. (Original) The method of claim 1 wherein the transform sampling/periodicity matrix of the transform in Cartesian coordinates is non-diagonal.
8. (Currently amended) The method of claim 1, further comprising the step of distributing groups of receivers or single sensor seismic receivers so as to obtain the received seismic ~~measurements~~ data on a staggered or hexagonal grid.
9. (Original) The method of claim 8 wherein the step of transforming comprises the use of a spatially staggered or hexagonal transformation.
10. (Original) The method of claim 9 wherein the step of transforming the signals comprises the use of a spatially staggered or hexagonal Fourier transformation.

11. (Original) The method of claim 1 wherein the filter is a zero-phase finite impulse response (FIR) filter.
12. (Original) The method of claim 1 wherein the filter has at least two dimensions.
13. (Original) The method of claim 1 wherein the filter is a 3D filter.
- 14-17 (Canceled)